

**Remarks/Arguments:**

Claims 1-18 are pending in the application.

Headings have been introduced as needed.

**Rejection under 35 U.S.C. § 112**

Claim 18 is rejected under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, for failing to comply with the written description requirement. The examiner indicates that the basis for this rejection is the teaching in the specification (page 8, lines 1 and 2) that graphite is usually not a suitable support material. Applicants agree that this is indeed taught at the cited passage. However, the examiner appears to believe that this is inconsistent with the feature of claim 18 reciting "wherein none of the one or more electrocatalyst metals is supported on a graphite support." Applicants believe that the examiner has misunderstood the meaning of this phrase, which is indeed consistent with the cited teaching in the specification. Applicants submit that the meaning of this phrase is as follows. Either the electrocatalyst metal is not supported at all, or it is supported on a material that is NOT graphite. (For example, the support material might be carbon black.) The electrocatalyst metal may be unsupported, or it may be supported. If it is supported, it is not supported on graphite, but on something else. This is consistent with the passage cited by the examiner. Thus, Applicants respectfully submit that the rejection is in error, and request withdrawal of the rejection.

**Rejection under 35 U.S.C. § 103**

The examiner rejects all claims as being unpatentable over U.S. 3,671,323 ("Sandler") in view of U.S. 5,399,184 ("Harada").

Sandler discloses a gas-liquid type electrochemical cell, as is clear from the description and from the description of the electrolyte in column 5, lines 35-37 ("which chamber is filled with electrolyte 27 such as NaOH or a 30 weight percent solution of KOH"). The examiner notes that Sandler's backing layer 11 and gas entrance layer 13 comprise a resinous binder such as PTFE or polysulfone resin. However, the examiner will no doubt appreciate that PTFE and polysulfone are not proton-conducting polymers, and thus Sandler does not disclose a composition comprising one or more proton-conducting polymers as presently claimed.

Further, the examiner has noted that Sandler does not disclose including graphite particles at a level of 1-40 weight percent with respect to the weight of the electrocatalyst, and Applicants concur. (Applicants note that the examiner actually refers to 1-40 weight

percent of graphite with respect to the total weight of the gas electrode, which would have no relevance to the present claims, but presume that the Examiner meant to discuss it with respect to the amount of electrocatalyst, as recited in the claims.) The examiner asserts that this deficiency of Sandler is remedied by Harada, saying that "The electrode catalyst used in the electrode catalyst layer may be selected from 5 to 30 weight percent of carbon particles coated with platinum (Col. 6, lines 43-60). Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the method for fabricating gas diffusion electrode assembly as by using the gas diffusion electrode composition taught by Sandler within the graphite range as taught by Harada." Applicants respectfully disagree with this conclusion, for the following reasons.

First, Harada does not teach the use of graphite at all, and never even mentions it in his patent. Needless to say, Harada certainly does not teach a specified range of graphite content with respect to the electrocatalyst, as recited in the claims. As the examiner has noted, Sandler does not disclose the claimed 1-40 wt% loading of graphite particles with respect to the amount of electrocatalyst as claimed, and Harada does not remedy this deficiency. Accordingly, a *prima facie* case of obviousness has not been presented, and the rejection should be withdrawn.

Second, the cited passage of Harada does not disclose that the electrode catalyst used in the electrode catalyst layer may be selected from 5 to 30 weight percent of carbon particles coated with platinum, as the examiner asserts. The cited passage does not discuss the amount of carbon present in the electrode catalyst layer. Rather, it merely discusses the loading of catalytic metal on the particulate carbon support. The relevant part (lines 52-60) of the cited passage reads as follows:

Such fine carbon particles coated with platinum catalyst are commercially available, and such commercial products include PLATINUM on VULCAN XC-72 and PLATINUM on VULCAN XC-72R manufactured by E-TEK Inc., which comprises carbon particles having a diameter of about 100 angstroms and a surface area of from 100 to 200 m<sup>2</sup>/g and coated with platinum of a diameter of about 20 angstroms in an amount of 5 to 30% by weight of the carbon particles.

Applicants note VULCAN XC-72R was demonstrated in their response to the previous office action to contain carbon black and not graphite. However, even if Harada had explicitly mentioned a catalyst supported on graphite (which he most certainly did not do), the cited passage indicates that the amount of catalyst metal would be only 5 to 30% by weight relative to it, i.e., considerably less catalyst than graphite. This is the exact opposite of the recitation in claim 1 of 1-40 wt% loading of graphite particles with respect to the amount of electrocatalyst, i.e., considerably more catalyst than graphite. Thus, neither the presently recited material (graphite) nor the correct amount of it (1-40 wt%) is taught by Harada. Accordingly, a *prima facie* case of obviousness has not been presented, and the rejection should be withdrawn.

In addition to the above, it should be pointed out that Sandler does not even disclose an electrocatalyst ink as claimed. Rather, Sandler describes his compositions for producing backing layer 11 and gas entry layer 13 as "stiff pastes" that are "spread." See the paragraph at the bottom of column 4 and the passages at column 6, line 33 and column 7, line 35. The skilled person would consider a paste to be considerably different from an ink such as described on page 5, lines 20-26 of the application, and which is not a paste but rather is capable of being filtered, sprayed etc. A similar situation exists for Harada, who discloses a method for fabricating a membrane electrode assembly. Again, the electrocatalyst layer is applied by first preparing a paste (see e.g., column 7, lines 17 and 42), not an ink. Therefore, both Sandler and Harada fail to disclose an ink.

Not all of the claim elements are taught by the combination of Sandler and Harada, and a *prima facie* case of obviousness has again not been presented.

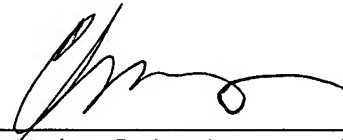
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Conclusion

For all of the foregoing reasons, Applicants respectfully request reconsideration and allowance of the claims. Applicants invite the examiner to contact their undersigned representative, Frank Tise, if it appears that this may expedite examination.

Respectfully submitted,



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